

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 09/936,160
Attorney Docket No. Q65858

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A programming device comprising:

a group of program generation tools to generate programs for each of a plurality of devices ~~that form~~ forming part of a control system ~~for controlling that controls~~ a group of external machines; and

a data sharing unit adapted to interface with said group of program generation tools to share a variable name and attribute data definitions corresponding to an object of each of said plurality of devices ,

wherein the objects are shared by said program generation tools for generating the programs.

2. (currently amended): The programming device according to claim 1, wherein programming action in one of the program generation tools relating to an object acts as a trigger to store a setting of the object to the data sharing unit together with an indication of the program generation tools which ~~is a reference~~ said object, and

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the sharing of said object with program generation tools other than said one of the program generation tools ~~notifies~~ includes notifying said object to the program generation tools other than said one of the program generation tools which reference said object.

3. (currently amended): The programming device according to claim 1, further comprising an object data definition unit adapted to perform data definition and data ~~changing~~ modification of the objects shared in the data sharing unit,

wherein all objects involved in the object sharing are ~~totally~~ centrally managed.

4. (currently amended): The programming device according to claim 1, further comprising:

a system configuration tool, being registered with a subset of said objects, said subset of said objects being basic type objects having a high frequency of use in the devices in the control system, the system configuration tool being adapted to select an object from the basic type objects ~~to be actually used~~ for use in the control system.

5. (currently amended): A programming device comprising a group of program generation tools for generating programs for each of a plurality of devices forming part of a control system ~~for controlling~~ that controls a group of machines,

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wherein one of the program generation tools performs data definition of a variable name and attribute data corresponding to an object in each of said devices forming part of ~~a~~the control system for controlling ~~a~~the group of machines, and

~~whereby~~ wherein the variable name and attribute data corresponding to said object are stored ~~to enable to be used for use~~ by program generation tools other than said one of the program generation tools.

6. (currently amended): The programming device according to claim 5, wherein information about whether or not the object is referenced by program generation tools other than said one of the program generation tools is registered, and

wherein the object is notified to ~~the~~ any program generation tools other than said one of the program generation tools which reference the object.

7. (currently amended): The programming device according to claim 6, further comprising a detection unit adapted to detect any overlap between a referenced part of the object ~~among the~~ and other stored objects when a program is generated by the program generation tools other than said one of the program generation tools.

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8. (currently amended): The programming device according to claim 6, wherein when an object ~~is~~ referenced by a first program generation tool from the group of program generation tools is changed by a second program generation tool from the group of program generation tools, the changed object is notified to the first program generation tool.

9. (currently amended): The programming device according to claim 6, wherein the object is notified to a storage area ~~which is confirmed for subsequent retrieval by the other~~ program generation tools which reference the object when they are started.

10. (currently amended): A programming method for generating programs for devices forming part of a control system ~~to control that controls~~ a group of machines, the method comprising:

according to a pre-designed virtual object, defining an object name and attribute data corresponding to an object of each of the devices forming part of ~~a~~ the control system to control ~~a~~ the group of machines, specifying a device that will use the object, and registering ~~the~~ information on the object and the specified device in a data sharing unit;

notifying ~~the~~ each object to a program generation tool for the specified device that will use the object; and

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according to the objects registered in the data sharing unit, performing programming of the ~~device~~ devices by the notified program generation tools.

11. (new): The programming device according to claim 1, wherein the plurality of devices include a display device, said display device for displaying the status of each of the machines.

12. (new): The programming device according to claim 1, wherein the plurality of devices includes a system supervision device, said system supervision device for detecting an abnormal condition of a production line comprising the group of machines.

13. (new): The programming device according to claim 1, wherein the plurality of devices includes a programmable controller for controlling one or more of the machines.